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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,424	09/02/2004	Yoshikazu Makioka	082460	1252
38834 7590 02/26/2009 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036				
EXAMINER HAYLIN, ROBERT H				
ART UNIT		PAPER NUMBER		
1626				
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02/26/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/506,424

**Applicant(s)**

MAKIOKA ET AL.

**Examiner**

ROBERT HAVLIN

**Art Unit**

1626

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 15-20, 27 and 28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-20, 27 and 28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

**Status of the claims:** Claims 15-20, 27 and 28 are currently pending.

**Priority:** This application is a 371 of PCT/JP03/02422 (03/03/2003) and claims foreign priority to JAPAN 2002057419 (03/04/2002).

**RCE:** A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/17/08 has been entered.

### **RESPONSE TO APPLICANT ARGUMENTS**

#### ***Claim Rejections - 35 USC § 103***

1. Claims 15-20 were rejected under 35 U.S.C. 103(a) as being unpatentable over Delangle et al. (J. Org. Chem, 1996, v. 61, p. 8904-14) in view of Alberts et al. (J. Am. Chem. Soc., 1979, v. 101, p.3545-53).

Applicant argues that the prior art does not teach extracting rare earth metal ions or the claimed phosphoramidate macrocycle. First, one of ordinary skill in the art would know that the compounds of Delangle would also complex rare earth metal ions because their radii of the two are comparable and thus can physically fit into the same site. Second, the instant claims are for a process which utilizes a macrocycle that is structurally similar to that of the prior art and one of ordinary skill in the art would be well aware of predictable interchangeability of metals with ligands. Thus, one of ordinary

skill in the art would find the claimed method obvious because the prior art reference of Delangle identified the utility of macrocyclic compounds such as those claimed here and their ability to complex metals.

Therefore, because the prior art teaches rare earth metals in context with a structurally similar compound to complex and extract metal ions, the claims remain obvious and **the rejection maintained**.

***Claim Rejections - 35 USC § 112***

2. Claims 21-26 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims were cancelled thus the rejection is moot.

**NEW REJECTIONS**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 15-20 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laskorin et al. (CAPLUS Abstract of Radiokhimiya (1984), 26(2), 161-6) in view of Romanovskiy et al. (US 6,258,333).

The instant claims are for a process of extracting rare earth metal ions from an



aqueous phase using a compound of the formula in an organic solvent that is immiscible, transferring the metal back to aqueous phase in an acidic environment.

1. *Determining the scope and contents of the prior art.*

Laskorin et al. teaches uranyl complexes with the following compound

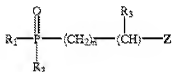


and correlates the extraction capacity of the compound with the IR spectrum.

Romanovskiy et al. (US 6,258,333) teaches a process for extracting rare earth metal ions using a solution including a neutral organophosphorus compound. Romanovskiy also claims as part of the process: using an organic phase which is separated from the aqueous phase; a stripping agent to allow back extraction of the metal into the aqueous phase. In addition, the reference teaches the invention is designed to be used on the acidic waste products of reactors. The reference also teaches several specific examples of extractions on cols. 10-11 including one where the organic:aqueous ratio was 1:1.

2. *Ascertaining the differences between the prior art and the claims at issue.*

The difference between the prior art and the claims is Romanovski generically teaches a neutral organophosphorus compound including species of the formula



while the instant claims are for a phosphonamide compound



of the formula . However, the compound taught by Laskorin is a member of the instantly claimed genus.

3. *Resolving the level of ordinary skill in the pertinent art.*

One of ordinary skill in the art is capable of altering the chemical structure of phosphine oxide based compounds and testing them for their ability to complex rare earth metal ions. This type of experimentation is routine and is part of the teaching of Laskorin in the generic compounds (I).

4. *Considering objective evidence present in the application indicating obviousness or nonobviousness.*

Laskorin provides a very strong motivation for one of ordinary skill in the art to apply the teachings of Romanovski to arrive at the instantly claimed invention. Laskorin discloses a compound capable of complexing the rare earth metal of uranium and even correlates the IR spectrum with extraction capacity. Thus based on the specific motivation of the ability of the Laskorin compound to extract rare earth metals and the

structural similarities to the compounds used in the extraction process of Romanovskiy it would have been obvious to one of ordinary skill in the art to combine the references and arrive at the instantly claimed invention.

In *Eisai Co. Ltd. v. Dr. Reddy's Laboratories Ltd.*, 87 USPQ2d 1452, 1454 (Fed. Cir. 2008), the Federal Circuit clarified the proof of obviousness in structural similarity situations such as this:

Where, as here, the patent at issue claims a chemical compound, the analysis of the third Graham factor (the differences between the claimed invention and the prior art) often turns on the structural similarities and differences between the claimed compound and the prior art compounds. See *Eli Lilly & Co. v. Zenith Goldline Pharms., Inc.*, 471 F.3d 1369, 1377 [81 USPQ2d 1324] (Fed. Cir. 2006) (noting that, for a chemical compound, a prima facie case of obviousness requires "structural similarity between claimed and prior art subject matter ... where the prior art gives reason or motivation to make the claimed compositions" (quoting *In re Dillon*, 919 F.2d 688, 692 (Fed. Cir. 1990) (en banc))).

Obviousness based on structural similarity thus can be proved by identification of some motivation that would have led one of ordinary skill in the art to select and then modify a known compound (i.e. a lead compound) in a particular way to achieve the claimed compound. See *Takeda Chem. Indus. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356 [83 USPQ2d 1169] (Fed. Cir. 2007). In keeping with the flexible nature of the obviousness inquiry, *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1739 [82 USPQ2d 1385] (2007), the requisite motivation can come

from any number of sources and need not necessarily be explicit in the art. See *Aventis Pharma Deutschland GmbH v. Lupin, Ltd.*, 499 F.3d 1293, 1301 [84 USPQ2d 1198] (Fed. Cir. 2007). Rather "it is sufficient to show that the claimed and prior art compounds possess a 'sufficiently close relationship ... to create an expectation,' in light of the totality of the prior art, that the new compound will have 'similar properties' to the old." *Id.* (quoting *Dillon*, 919 F.2d at 692).

In addition, because Laskorin motivated the use of the compound in extractions of uranium and there is a substantial structural similarity to the compounds of Romanovski there was an expectation that the compound disclosed by Laskorin would have similar properties and therefore was obvious.

#### ***Conclusion***

The claims are not in condition for allowance.

#### ***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT HAVLIN whose telephone number is (571)272-9066. The examiner can normally be reached on Mon. - Fri., 7:30am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful the examiner's supervisor, Joe McKane can be reached at (571) 272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert Havlin/  
Examiner

/Rebecca L Anderson/  
Primary Examiner, Art Unit 1626